Missed Anterior Inferior Cerebellar Artery Aneurysm Mimicking Vestibular Neuritis-Clues to Prevent Misdiagnosis

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Missed AICA aneurysm mimicking vestibular neuritis – clues to prevent misdiagnosis

Jan-Folkard Willms M.D.[1], Gerasimos Baltsavias M.D.[2], Jan-Karl Burkhardt M.D.[1], Silvia Ernst M.D.[3], Alexander A. Tarnutzer M.D.[1]

1 Department of Neurosurgery, University Hospital Zurich and University of Zurich, Frauenklinikstr. 10, 8091 Zurich, Switzerland
2 Department of Neuroradiology, University Hospital Zurich, Frauenklinikstr. 10, 8091 Zurich, Switzerland
3 Department of Internal Medicine, Hospital Uster, Brunnenstrasse 42, 8610 Uster, Switzerland

Running title: AICA aneurysm mimicking vestibular neuritis

Corresponding author:
Alexander A. Tarnutzer, MD. Department of Neurosurgery, University Hospital Zurich. Frauenklinikstr. 10, 8091 Zurich, Switzerland. Phone: 0041 44 255 11 11. Fax: 0041 44 255 43 80. Email: alexander.tarnutzer@usz.ch

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Abstract

We discuss a case with combined vestibulo-cochlear and facial neuropathy mimicking a less urgent peripheral-vestibular pattern of acute vestibular syndrome (AVS). With initial MR-imaging read as normal, the patient was treated for vestibular neuropathy until headaches worsened and a diagnosis of subarachnoid hemorrhage was made. On conventional angiography a ruptured distal right-sided aneurysm of the anterior inferior cerebellar artery was diagnosed and coiled. While acute vestibular loss usually points to a benign peripheral cause of AVS, combined neuropathy of the vestibulo-cochlear and the facial nerve requires immediate neuroimaging focusing on the cerebellopontine angle. Imaging should be assessed jointly by neuroradiologists and the clinicians in charge to take the clinical context into account.

Key words: MRI; acute vestibular syndrome; aneurysm; anterior inferior cerebellar artery; and diagnostic errors

Manuscript

Acute dizziness/vertigo accounts for 3.3-4.4% of all emergency-department consultations.[1] If dizziness/vertigo persists >24h and is accompanied by nausea/vomitus, nystagmus and gait imbalance, it is called acute vestibular syndrome (AVS).[2] A bedside ocular-motor examination (H.I.N.T.S.-plus; Head-Impulse-test, Nystagmus, Test-of-Skew, hearing-loss) proved successful in identifying those 25±15% with central causes.[2, 3] Here we report on pitfalls in peripheral-type AVS.

An 81-year-old woman presented with progressive vertigo over days, nausea/vomitus, new-onset headache and gait imbalance. A spontaneous left-beating nystagmus and a right-sided peripheral facial palsy were noted. Head-impulse testing was inconclusive, hearing was not assessed. She was hospitalized for suspected stroke and received a contrast-enhanced MRI, which was read as normal. Vestibular neuritis was considered and prednisone was prescribed. The patient's condition stabilized. However, on day five her headache suddenly worsened and her GCS dropped to 7. Head-CT demonstrated acute subarachnoid hemorrhage (SAH) (Fig. 1A). On digital-subtraction angiography a ruptured aneurysm of the right anterior-inferior cerebellar artery (AICA) was identified (Fig. 1B). Retrospectively, the aneurysm could be recognized on the initial MR-images (Fig. 1CD), demonstrating close proximity to the vestibulo-cochlear nerve and the facial nerve. Endovascular treatment was performed (Fig. 1E). While neurologically stable, she soon developed abdominal pain. On emergency surgery mesenteric ischemia was found. Facing extensive necrosis, palliative treatment was chosen. She died the next day.

New-onset headache, facial palsy and the progressive course over several days are the essential clues. This combination requires early vigilance and immediate evaluation. Except for Ramsey-Hunt-syndrome (with characteristic vesicles behind the ear, within the auditory canal and the palate),[4] a peripheral-type facial palsy or hearing-loss are incompatible with vestibular neuritis and must be considered 'red-flags'.[3] With the H.I.N.T.S.-plus likely

being negative and clinical findings pointing to the cerebello-pontine angle, MR-imaging and joint-assessment by the neuroradiologist and the clinician is paramount. While bleeding into a vestibular schwannoma may be considered,[5] dangerous vascular causes must be excluded.

Incidence for intracranial aneurysms is 9.7-14.5/100'000,[6] resulting in ~30'000 SAH annually in the US. AICA-aneurysms represent a tiny fraction (1-2%),[7] with distal location being exceptional (0.03%-0.22%, ~30 cases annually).[7, 8] While ~80% are diagnosed after rupture,[9] cerebello-pontine signs may be observed in unruptured AICA-aneurysms.[7, 9] This includes sudden hearing-loss or vertigo followed by facial palsy,[10] isolated acute,[8] episodic or chronic vertigo,[11] misdiagnosed as vestibular schwannoma or other cerebello-pontine-angle tumors.[10, 11] Warning signs in distal AICA-aneurysms may be observed in up to 50%.[8] With 250'000-500'000 AVS-cases annually,[2] distal AICA-aneurysms reflect <0.01%, making it a rare, but dangerous differential diagnosis. There should be a high-index of suspicion for vascular events, as current imaging techniques are limited for the inner ear and such changes are easily missed, sometimes requiring repeated imaging.

Required statements

The next of kin (son of the deceased patient) has consented to submission of this case report to the journal.

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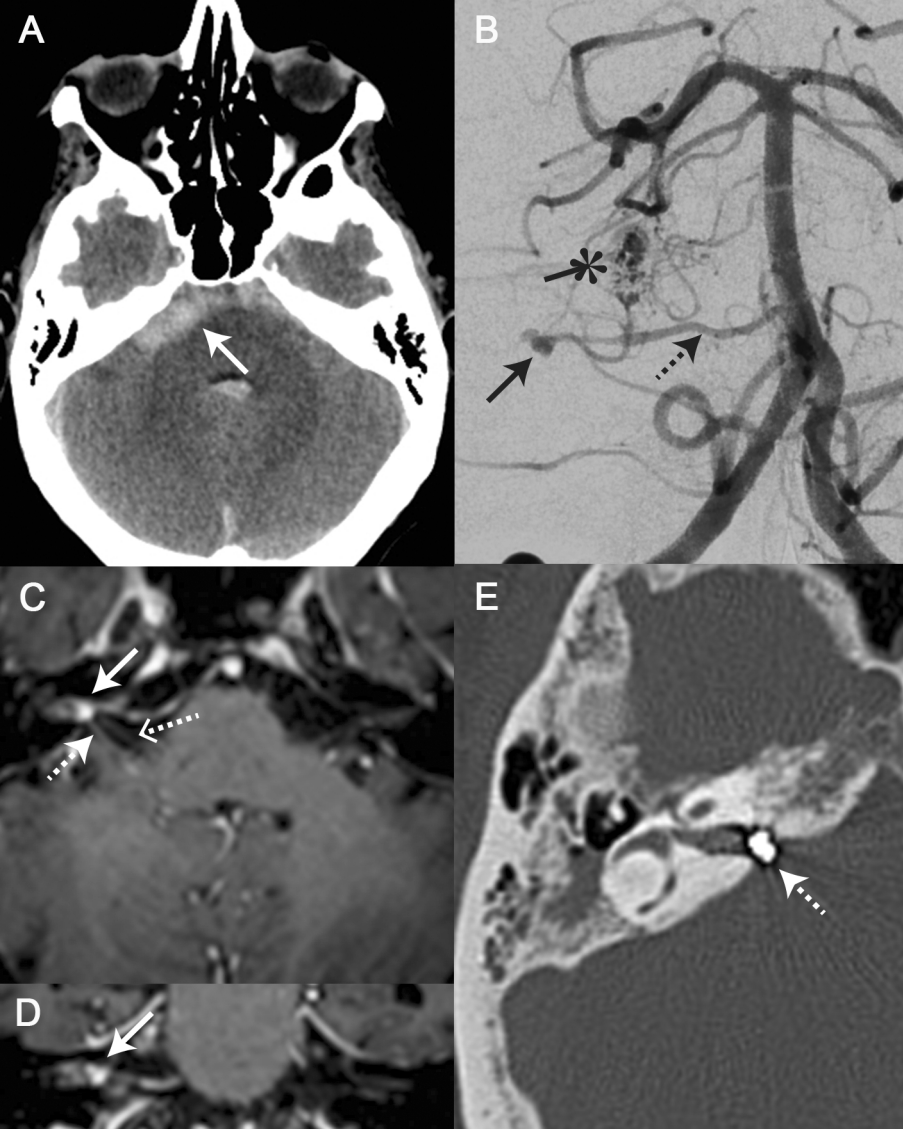
Figure 1:

Panel A: Illustration of the subarachnoid hemorrhage (SAH) distributed mostly around the right cerebello-pontine angle (solid arrow) on native head-CT hours after onset of severe headaches. Panel B: digital-subtraction angiography image in the anterior-posterior plane obtained the day after diagnosing the SAH showing the course of the right anterior inferior cerebellar artery (AICA) (dashed arrow) including the ruptured flow-related meatal AICA-aneurysm (solid arrow) and the arterio-venous malformation (star) fed predominantly by the AICA. Panels C&D: axial and coronal T1 post-contrast MR-images demonstrating the right AICA, the flow-related AICA-aneurysm (solid arrow) and its close proximity to the vestibulo-cochlear nerve (dashed-filled arrows) and the facial nerve (dashed-empty arrow). Panel E: demonstration of the coils (dashed arrow) after successful occlusion of the AICA-aneurysm located within the proximal part of the internal auditory canal.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